

**CLAIMS:**

1. A protective acoustic cover assembly comprising:
  - (i) a metal foil with perforations, and
  - (ii) a treatment on one or more surfaces of said metal foil.
2. The protective acoustic cover assembly of claim 1, wherein said protective acoustic cover assembly has an average specific acoustic resistance of less than about 11 Rayls MKS from 250-300 Hz.
3. The protective acoustic cover assembly of claim 1, wherein said protective acoustic cover assembly has an average specific acoustic reactance magnitude of less than about 1 Rayls MKS from 250-300 Hz.
4. The protective acoustic cover assembly of claim 1, wherein said protective acoustic cover assembly has an instantaneous water entry pressure value of greater than about 11 cm.
5. The protective acoustic cover assembly of claim 1 wherein said perforations have an average maximum pore size of less than about 150 micrometers.
6. The protective acoustic cover assembly of claim 1 wherein said treatment is a hydrophobic treatment.
7. The protective acoustic cover assembly of claim 1 wherein said treatment is an oleophobic treatment.
8. The protective acoustic cover assembly of claim 1 further comprising an adhesive mounting system.
9. The protective acoustic cover assembly of claim 1 wherein said metal foil is nickel.
10. A protective acoustic cover assembly comprising:
  - (i) a metal foil with perforations, and
  - (ii) a treatment on one or more surfaces of said metal foil,

5 wherein said protective acoustic cover assembly has an average specific acoustic resistance of less than about 11 Rayls MKS from 250-300 Hz, an average specific acoustic reactance magnitude of less than about 1 Rayls MKS from 250-300 Hz, an instantaneous water entry pressure value of greater than about 11 cm; and

10 wherein said perforations have an average maximum pore size of less than about 150 micrometers; and

wherein said metal foil is nickel.

11. An apparatus comprising:
- 15 (a) an acoustic transducer;
- (b) a housing having at least one aperture, said housing at least partially enclosing said acoustic transducer;
- (c) a protective acoustic cover assembly disposed proximate said aperture between said acoustic transducer and said housing, said protective acoustic cover assembly comprising:
- 20 (i) a metal foil with perforations, and
- (ii) a treatment on one or more surfaces of said metal foil.

12. The apparatus of claim 11, wherein said protective acoustic cover assembly has an average specific acoustic resistance of less than about 11 Rayls MKS from 250-300 Hz.

13. The apparatus of claim 11, wherein said protective acoustic cover assembly has an average specific acoustic reactance magnitude of less than about 1 Rayls MKS from 250-300 Hz.

14. The apparatus of claim 11, wherein said protective acoustic cover assembly has an instantaneous water entry pressure value of greater than about 11 cm.

15. The apparatus of claim 11 wherein said perforations have an average maximum pore size of less than about 150 micrometers.

16. The apparatus of claim 11 wherein said treatment is a hydrophobic treatment.
- 5 17. The apparatus of claim 11 wherein said treatment is an oleophobic treatment.
18. The apparatus of claim 11 wherein said protective acoustic cover assembly further comprises an adhesive mounting system.
- 10 19. The apparatus of claim 11 wherein said metal foil is nickel.
20. The apparatus of claim 11, wherein said protective acoustic cover assembly is integral with said housing absent any adhesive.
21. An apparatus comprising:
- 15 (a) an acoustic transducer;
- (b) a housing having at least one aperture, said housing at least partially enclosing said acoustic transducer;
- (c) a protective acoustic cover assembly disposed proximate said aperture between said acoustic transducer and said housing, said protective acoustic cover assembly comprising:
- 20 (i) a metal foil with perforations having an average maximum pore size of less than about 150 micrometers, and
- (ii) a hydrophobic or oleophobic treatment on one or more surfaces of said metal foil;
- (iii) an average specific acoustic resistance of less than about 11
- 25 Rayls MKS from 250-300 Hz;
- (iv) an average specific acoustic reactance magnitude of less than about 1 Rayls MKS from 250-300 Hz; and
- (v) an instantaneous water entry pressure value of greater than about 11 cm.
- 30 22. A method of protecting an acoustic transducer disposed in a housing having an aperture comprising the steps of:
- (a) providing a protective acoustic cover assembly disposed proximate said aperture between said acoustic transducer and said housing, said protective

acoustic cover assembly comprising:

- (i) a metal foil with perforations, and
  - (ii) a treatment on one or more surfaces of said metal foil;
  - (b) mounting said protective acoustic cover assembly adjacent said
- 5   aperture to protect said acoustic transducer from particulates and liquid ingress.

23. The method of claim 22 wherein said metal foil is nickel.
24. The method of claim 22 wherein said perforations have an average
- maximum pore size of less than about 150 micrometers.
- 10   25. The method of claim 22 wherein said protective acoustic cover assembly
- has an instantaneous water entry pressure value of greater than about 11 cm.